# Virginia Grade Level Alternative Worksheet

Grade 8 Science (1995)

*For students completing Gr 8 Science on a semester block schedule in Fall 2007*

Student's Name: _____ State Testing Identifier:_____

*Check all that apply*:

_____ Assigned scores have been entered into the online VGLA System.

_____ Assigned scores have been verified and submitted for final scoring in the online VGLA System.

An "X" under No Evidence represents a Total of 0.

| Reporting Category | SOL # | Specific Virginia Standard of Learning | Demonstrated ( 0 to 4 ) | Inferred ( 0 to 4 ) | No Evidence ( 0 ) | Total ( 0 to 4 ) |
|---|---|---|---|---|---|---|
| **RC 1** | **6.1** | The student will plan and conduct investigations in which<br>a) observations are made involving fine discrimination between similar objects and organisms;<br>b) a classification system is developed based on multiple attributes;<br>c) differences in descriptions and working definitions are made;<br>d) precise and approximate measures are recorded;<br>e) scale models are used to estimate distance, volume, and quantity;<br>f) hypotheses are stated in ways that identify the independent (manipulated) and dependent (responding) variables;<br>g) a method is devised to test the validity of predictions and inferences;<br>h) one variable is manipulated over time with many repeated trials;<br>i) data are collected, recorded, analyzed, and reported using appropriate metric measurement;<br>j) data are organized and communicated through graphical representation (graphs, charts, and diagrams); and<br>k) models are designed to explain a sequence. | | | | |
| **RC 1** | **6.2** | The student will demonstrate scientific reasoning and logic. Key concepts include<br>a) ideas are investigated by asking for and actively seeking information;<br>b) multiple tests of ideas are performed before accepting or rejecting them;<br>c) alternative scientific explanations are analyzed; and<br>d) conclusions are based on scientific evidence obtained from a variety of sources. | | | | |
| **RC 1** | **LS.1** | The student will plan and conduct investigations in which<br>a) data are organized into tables showing repeated trials and means;<br>b) variables are defined;<br>c) SI (metric) units are used;<br>d) criteria are established for evaluating a prediction;<br>e) models are constructed to illustrate and explain phenomena;<br>f) sources of experimental error are identified;<br>g) dependent variables, independent variables, and constants are identified;<br>h) variables are controlled to test hypotheses and trials are repeated;<br>i) continuous line graphs are constructed, interpreted, and used to make predictions; and<br>j) interpretations from the same set of data are evaluated and defended. | | | | |

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| **RC 1** | **PS.1** | The student will plan and conduct investigations in which<br>a) length, mass, volume, density, temperature, weight, and force are accurately measured and reported using the International System of Units (SI - metric);<br>b) triple beam and electronic balances, thermometers, metric rulers, graduated cylinders, and spring scales are used to gather data;<br>c) data from experiments are recorded and interpreted from bar, line, and circle graphs;<br>d) research skills are utilized using a variety of resources;<br>e) independent and dependent variables, constants, controls, and repeated trials are identified;<br>f) valid conclusions are made after analyzing data;<br>g) research methods are used to investigate practical problems and questions; and<br>h) experimental results are presented in appropriate written form. | | | | |
| **RC 2** | **6.3** | The student will investigate and understand sources of energy and their transformations Key concepts include<br>a) potential and kinetic energy;<br>b) energy sources (fossil fuels, wood, wind, water, solar, and nuclear power); and<br>c) energy transformations (mechanical to electrical, electrical to heat/light, chemical to light, and chemical to electrical/light). | | | | |
| **RC 2** | **6.4** | The student will investigate and understand basic characteristics of electricity. Key concepts include<br>a) electrical energy can be produced from a variety of energy sources and can be transformed into almost any other form of energy;<br>b) electricity is related to magnetism;<br>c) currents are either alternating or direct;<br>d) circuits can be parallel or series;<br>e) electrical energy can be described in volts and amps; and<br>f) electrical energy consumption is measured using common units (kilowatts/kilowatt hours). | | | | |
| **RC 2** | **6.5** | The student will investigate and understand that all matter is made up of atoms. Key concepts include<br>a) atoms are made up of electrons, protons, and neutrons;<br>b) atoms of any element are alike but are different from atoms of other elements; and<br>c) historical development and significance of discoveries related to the atom. | | | | |
| **RC 2** | **6.6** | The student will investigate and understand how to classify materials as elements, compounds, or mixtures. Key concepts include<br>a) mixtures can be separated by physical processes;<br>b) compounds can only be separated by chemical processes; and<br>c) elements cannot be separated by physical or chemical means. | | | | |
| **RC 2** | **6.7** | The student will investigate and understand that matter has physical and chemical properties and can undergo change. Key concepts include<br>a) physical changes; and<br>b) changes in chemical composition, including oxidation reactions (rusting and burning), photosynthesis, and acid-base neutralization reactions. | | | | |

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| **RC 2** | **PS.2** | The student will investigate and understand the basic nature of matter. Key concepts include<br>a) the particle theory of matter;<br>b) elements, compounds, mixtures, acids, bases, salts, organic, inorganic, solids, liquids, and gases;<br>c) characteristics of types of matter based on physical and chemical properties;<br>d) physical properties (shape, density, solubility, odor, melting point, boiling point, color); and<br>e) chemical properties (acidity, basicity, combustibility, reactivity). | | | | |
| **RC 2** | **PS.3** | The student will investigate and understand various models of atomic structure including Bohr and Cloud (quantum) models. | | | | |
| **RC 2** | **PS.4** | The student will investigate and understand how to use the periodic table of elements to obtain information. Key concepts include<br>a) symbols, atomic numbers, atomic mass, chemical families, periods, valence numbers metals, metalloids, and nonmetals; and<br>b) binary compounds (chemical activity, physical properties, formulas, and nature of bonding). | | | | |
| **RC 2** | **PS.5** | The student will investigate and understand changes in matter and the relationship of these changes to the Law of Conservation of Matter and Energy. Key concepts include<br>a) physical changes (effect of temperature on state, particle size on solubility, and temperature on solubility);<br>b) nuclear reactions (products of fusion and fission and their effects on human beings and the environment); and<br>c) chemical changes (types of reactions, reactants and products, and balanced equations). | | | | |
| **RC 2** | **PS.6** | The student will investigate and understand states and forms of energy and how energy is transferred and transformed. Key concepts include<br>a) potential and kinetic energy;<br>b) mechanical, chemical, and electrical energy; and<br>c) heat, light, and sound. | | | | |
| **RC 2** | **PS.7** | The student will investigate and understand temperature scales, heat, and heat transfer. Key concepts include<br>a) absolute zero, phase change, freezing point, melting point, boiling point, conduction, convection, radiation, vaporization, and condensation; and<br>b) applications of heat transfer (heat engines, thermostats, and refrigeration). | | | | |
| **RC 2** | **PS.8** | The student will investigate and understand characteristics of sound and technological applications of sound waves. Key concepts include<br>a) wave length, frequency, amplitude, interference; and<br>b) technological applications of sound. | | | | |

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| **RC 2** | **PS.9** | The student will investigate and understand the nature and technological applications of light. Key concepts include<br>a) reflection, refraction, particle theory, wave theory; and<br>b) electromagnetic spectrum. | | | | |
| **RC 2** | **PS.10** | The student will investigate and understand scientific principles and technological applications of work, force, and motion. Key concepts include<br>a) work, force, mechanical advantage, efficiency, power, horsepower, gravitational force, speed/velocity, mass/weight, Newton's three laws of motion, acceleration; and<br>b) applications (simple machines, compound machines, powered vehicles, rockets, restraining devices, projectiles). | | | | |
| **RC 2** | **PS.11** | The student will investigate and understand basic principles of electricity and magnetism. Key concepts include<br>a) static, current, circuits; and<br>b) magnetic fields and electromagnets. | | | | |
| **RC 3** | **6.8** | The student will investigate and understand that organisms perform life processes that are essential for the survival and perpetuation of the species. Key concepts include<br>a) energy transformation (from food or photosynthesis); and<br>b) respiration, movement, waste removal, growth, irritability (response), and reproduction. | | | | |
| **RC 3** | **LS.2** | The student will investigate and understand that all living things are composed of cells. Key concepts include<br>a) cell structure and organelles (cell membrane, cell wall, cytoplasm, vacuole, mitochondrion, endoplasmic reticulum, nucleus, and chloroplast);<br>b) similarities and differences between plant and animal cells;<br>c) development of cell theory; and<br>d) cell division (mitosis and meiosis). | | | | |
| **RC 3** | **LS.3** | The student will investigate and understand that living things show patterns of cellular organization. Key concepts include<br>a) cells, tissues, organs, and systems; and<br>b) functions and processes of cells, tissues, organs, and systems (respiration, removal of wastes, growth, reproduction, digestion, and cellular transport). | | | | |
| **RC 3** | **LS.4** | The student will investigate and understand that the basic needs of organisms must be met in order to carry out life processes. Key concepts include<br>a) plant needs (light and energy sources, water, gases, nutrients);<br>b) animal needs (food, water, gases, shelter, space); and<br>c) factors that influence life processes. | | | | |

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| **RC 3** | **LS.5** | The student will investigate and understand classification of organisms. Key concepts include<br>a) differences in number, color, size, shape, and texture of external and internal structures; and<br>b) variation in method of locomotion, obtaining nourishment, and reproduction. | | | | |
| **RC 3** | **LS.6** | The student will investigate and understand the basic physical and chemical processes of photosynthesis and its importance to plant and animal life. Key concepts include<br>a) energy transfer between sunlight and chlorophyll;<br>b) transformation of water and carbon dioxide into sugar, water, and oxygen; and<br>c) photosynthesis as the foundation of food webs. | | | | |
| **RC 3** | **LS.13** | The student will investigate and understand that organisms reproduce and transmit genetic information to new generations. Key concepts include<br>a) the role of DNA;<br>b) characteristics that can and cannot be inherited;<br>c) genetic engineering and its applications; and<br>d) historical contributions and significance of discoveries related to genetics. | | | | |
| **RC 3** | **LS.14** | The student will investigate and understand that organisms change over time. Key concepts include<br>a) the relationships of mutation, adaptation, natural selection, and extinction; | | | | |
| **RC 4** | **6.9** | The student will investigate and understand that organisms depend on other organisms and the nonliving components of the environment. Key concepts include<br>a) producers, consumers, and decomposers;<br>b) food webs and food pyramids; and<br>c) cycles (water, carbon dioxide/oxygen, nitrogen). | | | | |
| **RC 4** | **LS.7** | The student will investigate and understand that organisms within an ecosystem are dependent on one another and on nonliving components of the environment. Key concepts include<br>a) interactions resulting in a flow of energy and matter throughout the system;<br>b) complex relationships in terrestrial, freshwater, and marine ecosystems; and<br>c) energy flow in food chains, food webs, and food pyramids. | | | | |
| **RC 4** | **LS.8** | The student will investigate and understand that interactions exist among members of a population. Key concepts include<br>a) competition, cooperation, social hierarchy, territorial imperative; and<br>b) influence of behavior on population interactions. | | | | |
| **RC 4** | **LS.9** | The student will investigate and understand interactions among populations in a biological community. Key concepts include<br>a) the relationship among producers, consumers, and decomposers in food chains and food webs;<br>b) the relationship of predators and prey;<br>c) competition and cooperation;<br>d) symbiotic relationships and niches; and<br>e) the role of parasites and their hosts. | | | | |

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| **RC 4** | **LS.10** | The student will investigate and understand how organisms adapt to biotic and abiotic factors in a biome. Key concepts include<br>a) differences between ecosystems and biomes;<br>b) characteristics of land, marine, and freshwater biomes; and<br>c) adaptations that enable organisms to survive within a specific biome. | | | | |
| **RC 4** | **LS.11** | The student will investigate and understand that ecosystems, communities, populations, and organisms are dynamic and change over time (daily, seasonal, and long term). Key concepts include<br>a) phototropism, hibernation, and dormancy;<br>b) factors that increase or decrease population size; and<br>c) eutrophication, climate change, and catastrophic disturbances. | | | | |
| **RC 4** | **LS.12** | The student will investigate and understand the relationships between ecosystem dynamics and human activity. Key concepts include<br>a) food production and harvest;<br>b) change in habitat size, quality, and structure;<br>c) change in species competition; and<br>d) population disturbances and factors that threaten and enhance species survival. | | | | |
| **RC 5** | **6.10** | The student will investigate and understand the organization of the solar system and the relationships among the various bodies that comprise it. Key concepts include<br>a) the sun, moon, Earth, other planets and their moons, meteors, asteroids, and comets;<br>b) relative size of and distance between planets;<br>c) the role of gravity;<br>d) revolution and rotation;<br>e) the mechanics of day and night and phases of the moon;<br>f) the relationship of the Earth's tilt and seasons;<br>g) the cause of tides; and<br>h) the history and technology of space exploration. | | | | |
| **RC 5** | **6.11** | The student will investigate and understand public policy decisions relating to the environment. Key concepts include<br>a) management of renewable resources (water, air, plant life, animal life);<br>b) management of nonrenewable resources (coal, oil, natural gas, nuclear power); and<br>c) cost/benefit tradeoffs in conservation policies. | | | | |
| **RC 5** | **LS.12** | The student will investigate and understand the relationships between ecosystem dynamics and human activity. Key concepts include<br>e) environmental issues (water supply, air quality, energy production, and waste management). | | | | |
| **RC 5** | **LS.14** | The student will investigate and understand that organisms change over time. Key concepts include<br>b) evidence of evolution of different species in the fossil record; and<br>c) how environmental influences, as well as genetic variation, can lead to diversity of organisms. | | | | |

**Reporting Category Key**

**RC 1 Scientific Investigation**
**RC 2 Force, Motion, Energy, and Matter**
**RC 3 Life Systems**
**RC 4 Ecosystems**
**RC 5 Earth and Space Systems**